

AVIATION WEATHER CONDITIONS PRIOR TO TROPICAL CYCLONE LANDFALLS



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DISCUSSION

When a tropical cyclone threatens a given location, the focus is typically on issues such as “When will tropical storm force winds begin to affect that location?” and “What will the maximum winds be and when will those winds be experienced at that location?” While these questions are important, when considering an evacuation, especially the evacuation of general aviation aircraft, another important question is “What will the weather conditions be just prior to the time a tropical cyclone affects a location (i.e., during the time when an evacuation is being carried out)?”

Being able to quantify the amount of time before conditions deteriorate for a number of storms will help us to better understand how to prepare and may give insight into the overall evolution of tropical cyclones. To accomplish this, storm tracks and reports from the National Hurricane Center and surface hourly data from the National Climatic Data Center were used to create analyses of aviation weather conditions for the 120 hours leading up to the first tropical storm force winds experienced at an observing site. Analyses were created for each individual storm as well as aggregates of storms based on strength, location of impact, and time of impact.

ACKNOWLEDGEMENTS

I would like to thank Dr. Randell J. Barry for his expert advice and guidance throughout the entire process. This would not have been possible without his help.

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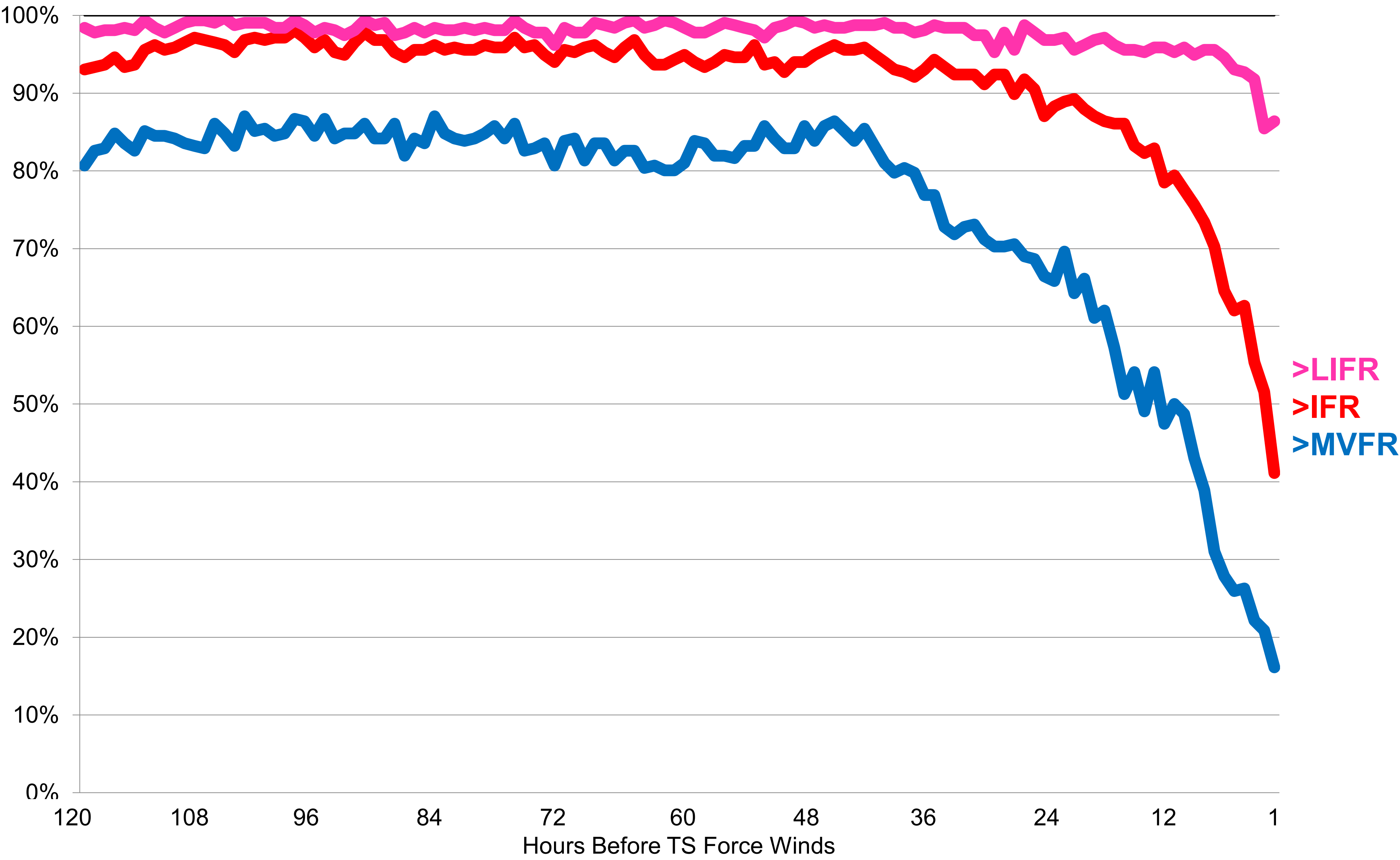
REFERENCES

National Climatic Data Center. (n.d.). Surface Global Hourly Database. Retrieved June 21, 2017, from <https://www7.ncdc.noaa.gov/CDO/cdopoemain.cmd?datasetabbv=DS3505&countryaabbv=&georegionabbv=&resolution=40>

National Climatic Data Center. (2015, August 20). Federal Climate Complex Data Documentation For Integrated Surface Data. Retrieved November 3, 2017, from <https://www1.ncdc.noaa.gov/pub/data/ish/ish-format-document.pdf>

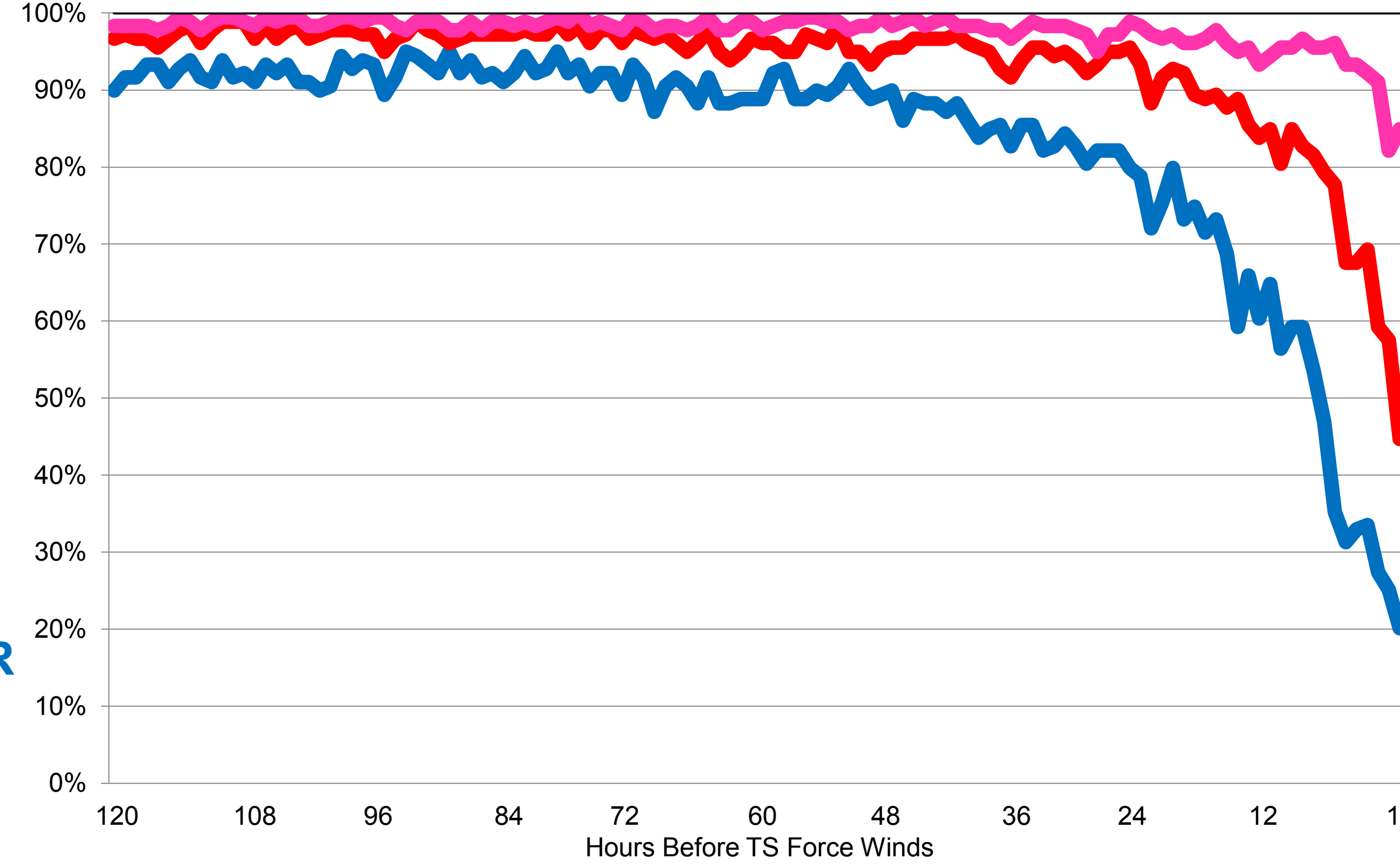
National Hurricane Center. (n.d.). Tropical Cyclone Reports. Retrieved June 21, 2017, from <http://www.nhc.noaa.gov/data/tcr/>

Graph 1. 2000-2016* Aviation Weather Conditions for All Storms (50 Storms, 316 Stations)

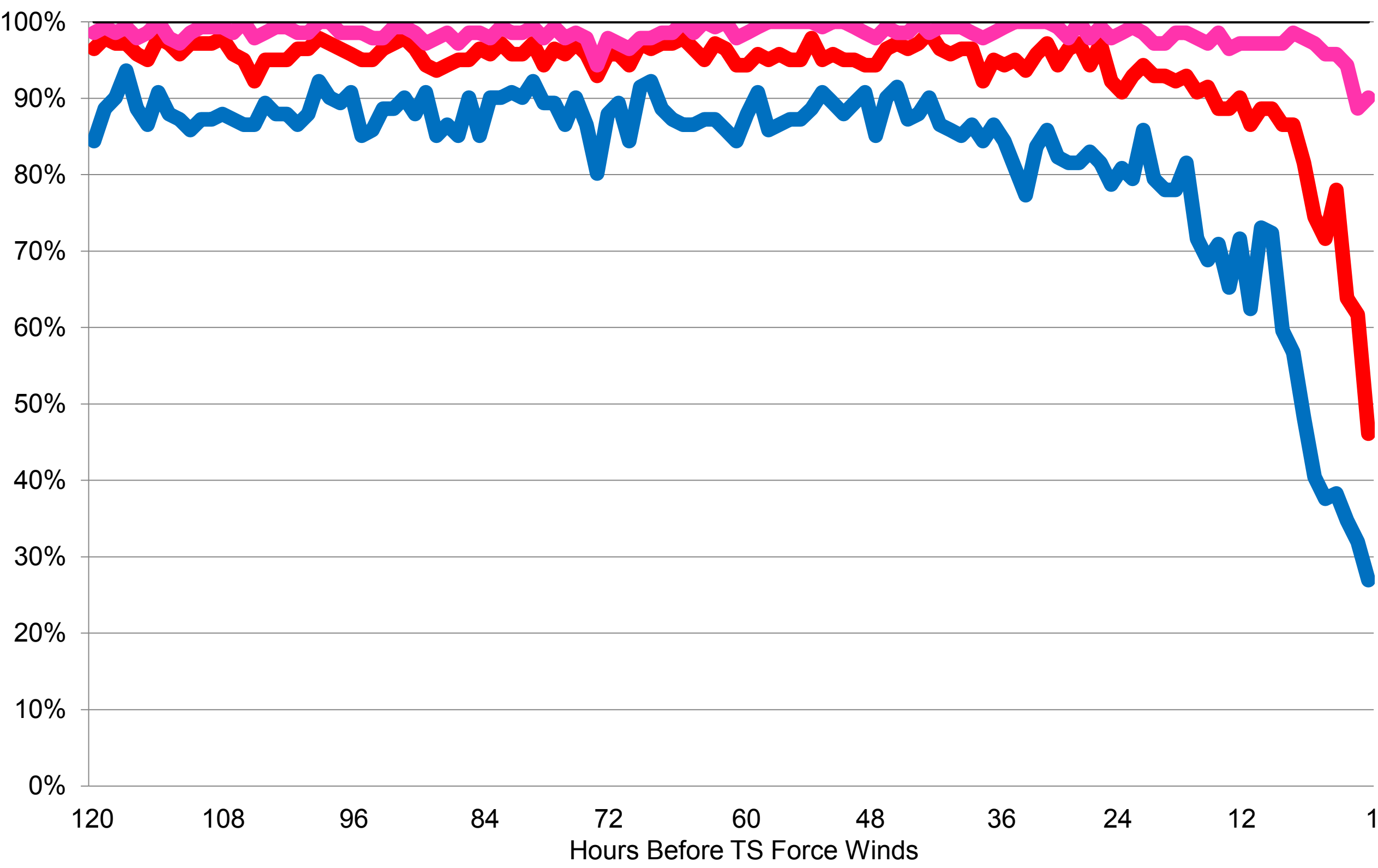


Aviation Weather Conditions:
VFR ceiling greater than 3,000 feet AGL and visibility greater than 5 miles (under blue)
MVFR ceiling 1,000 to 3,000 feet AGL and/or visibility 3 to 5 miles (between blue and red)
IFR ceiling greater than 500 to 1,000 feet AGL and/or visibility 1 to 3 miles (between red and magenta)
LIFR ceiling less than 500 feet AGL and/or visibility less than 1 mile (above magenta)

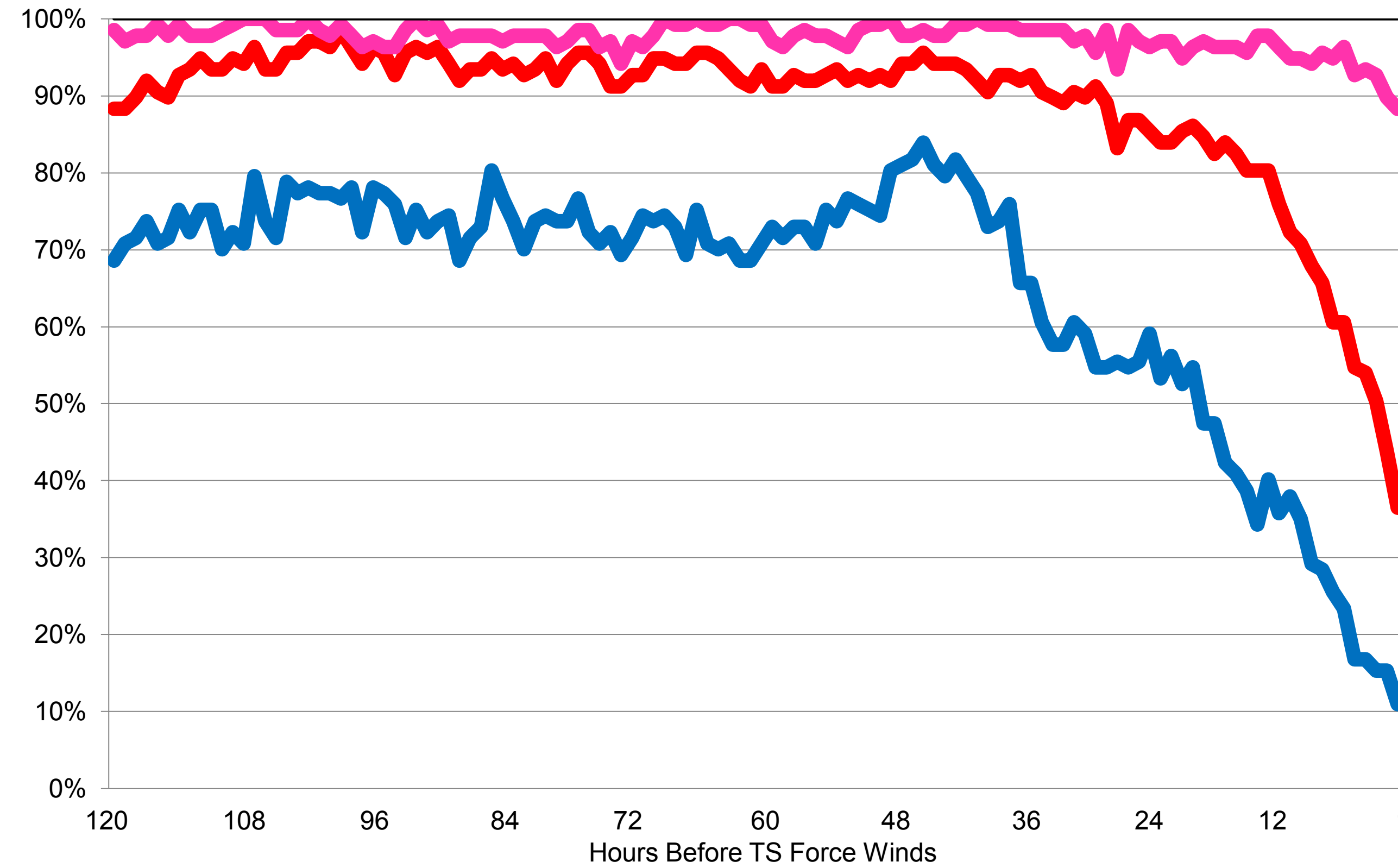
Graph 2. Early Season Before September 10th (35 Storms, 179 Stations)



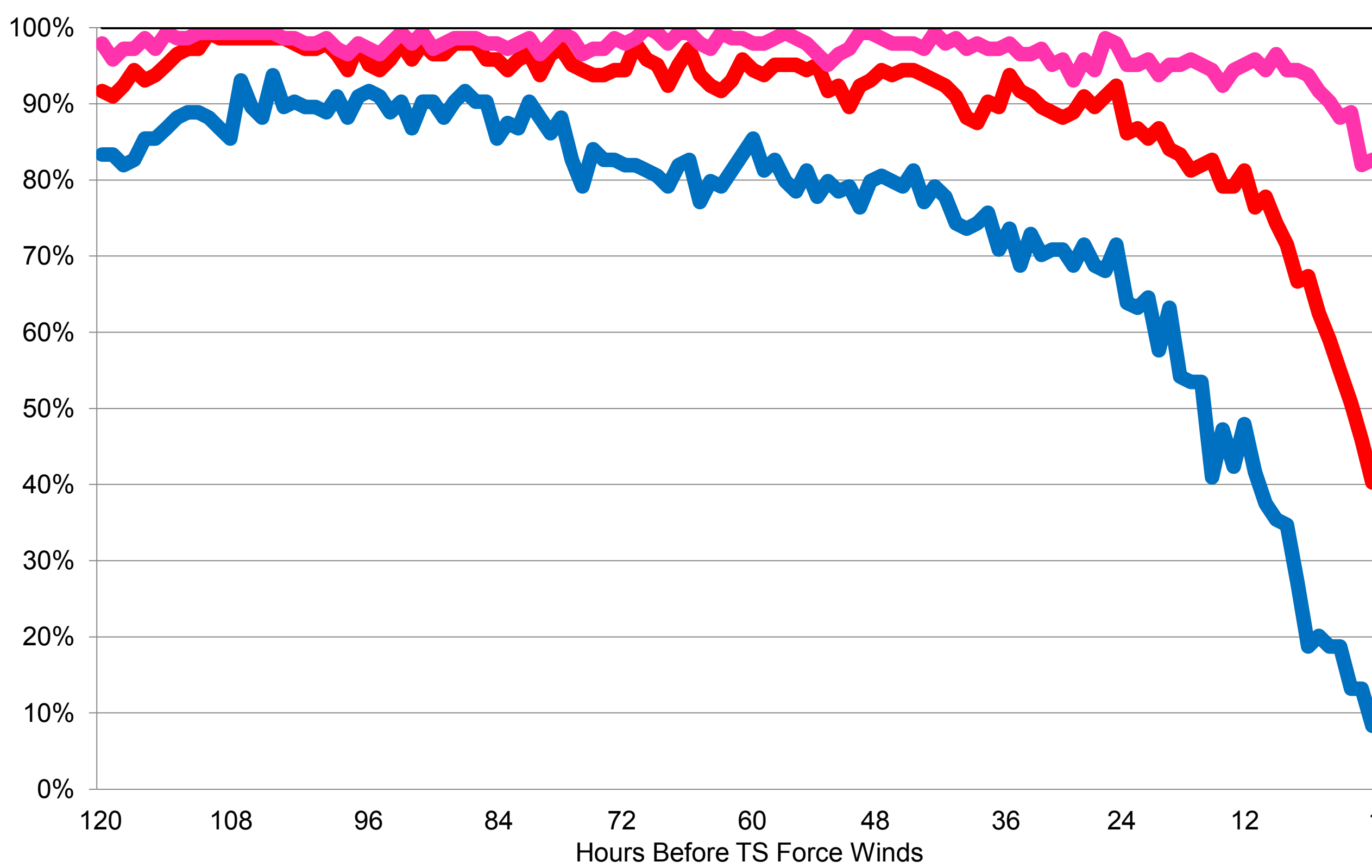
Graph 4. Gulf Landfalls (30 Storms, 141 Stations)



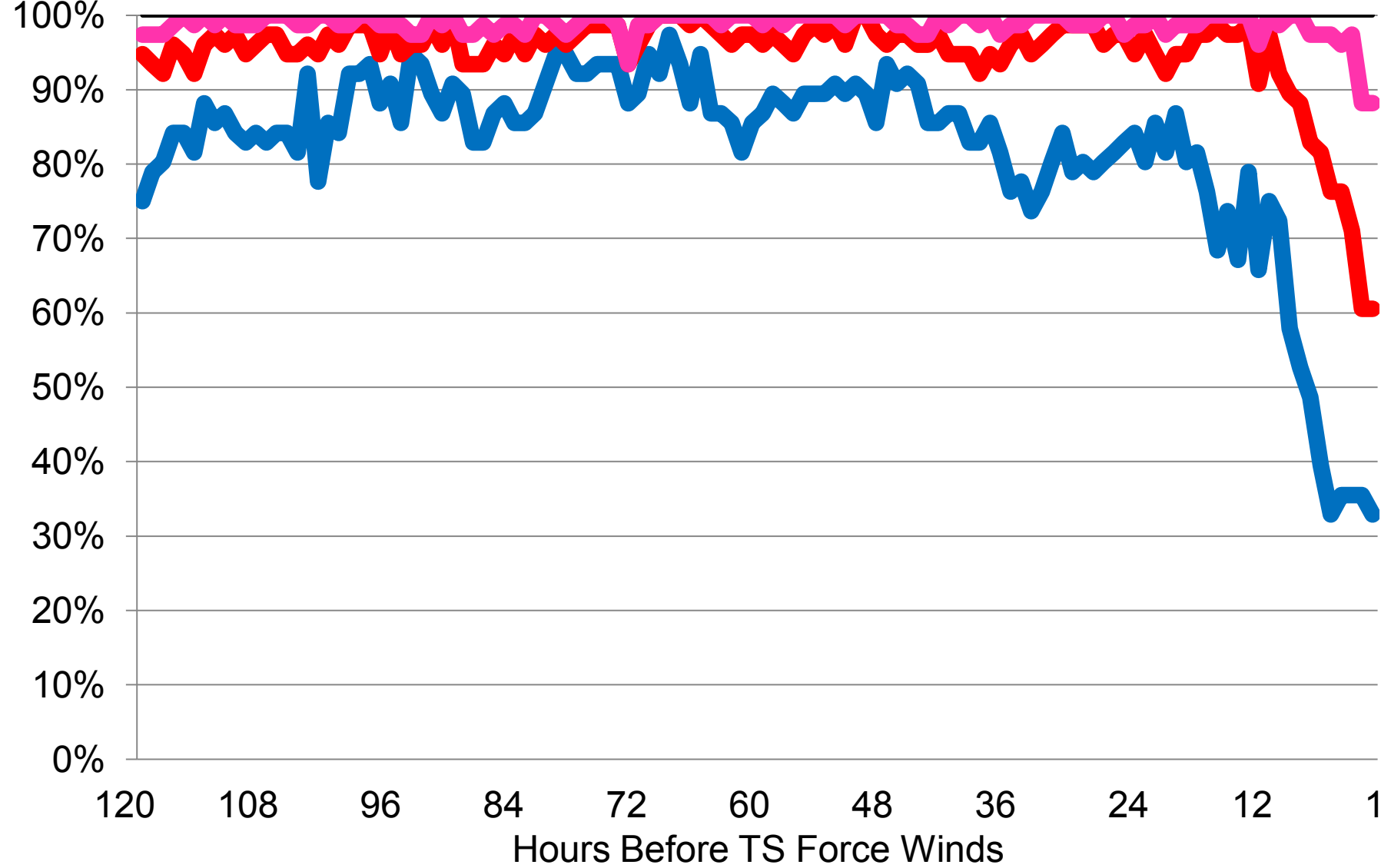
Graph 3. Late Season After September 10th (15 Storms, 137 Stations)



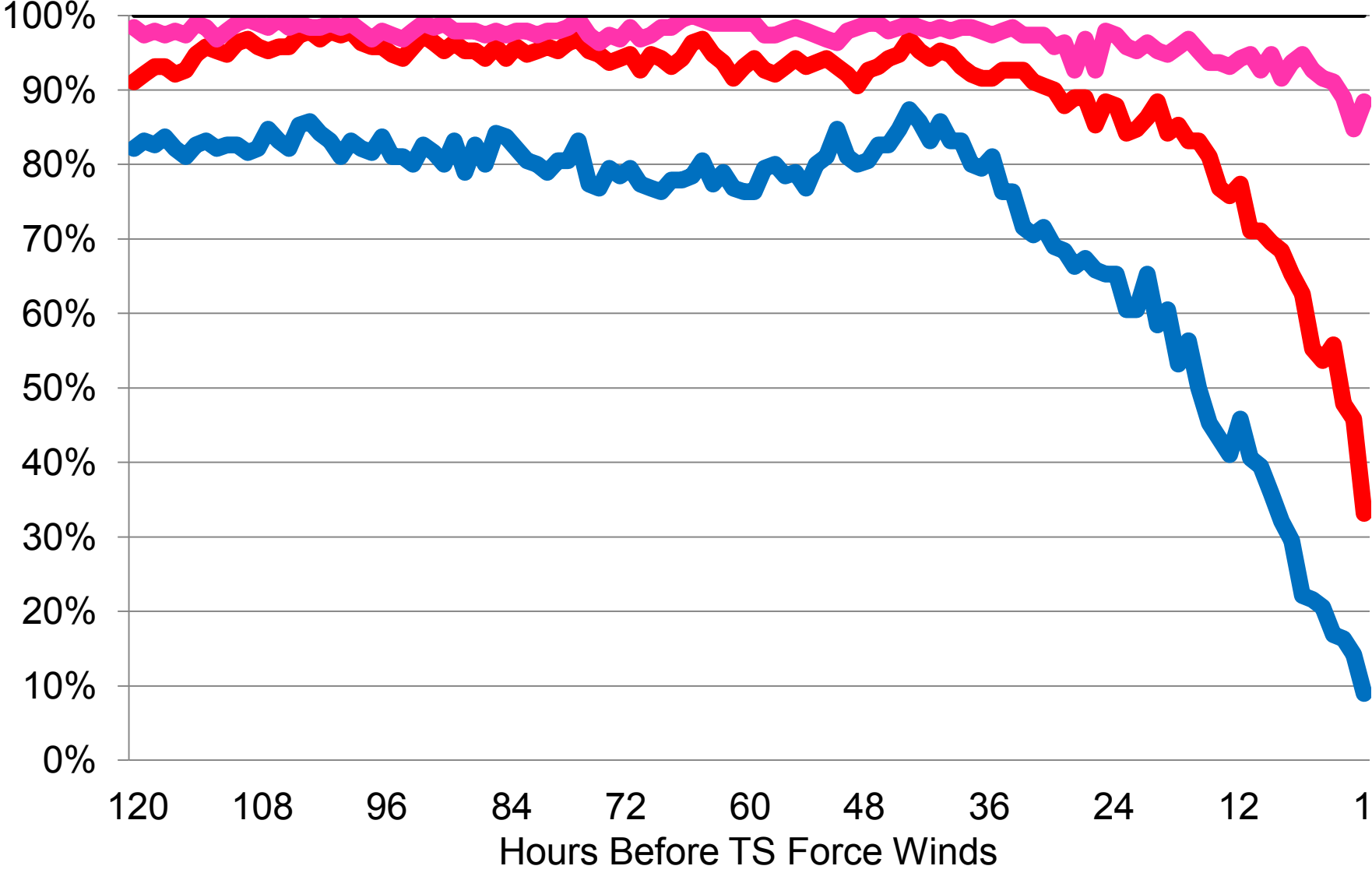
Graph 5. Southeast Landfalls (19 Storms, 144 Stations)



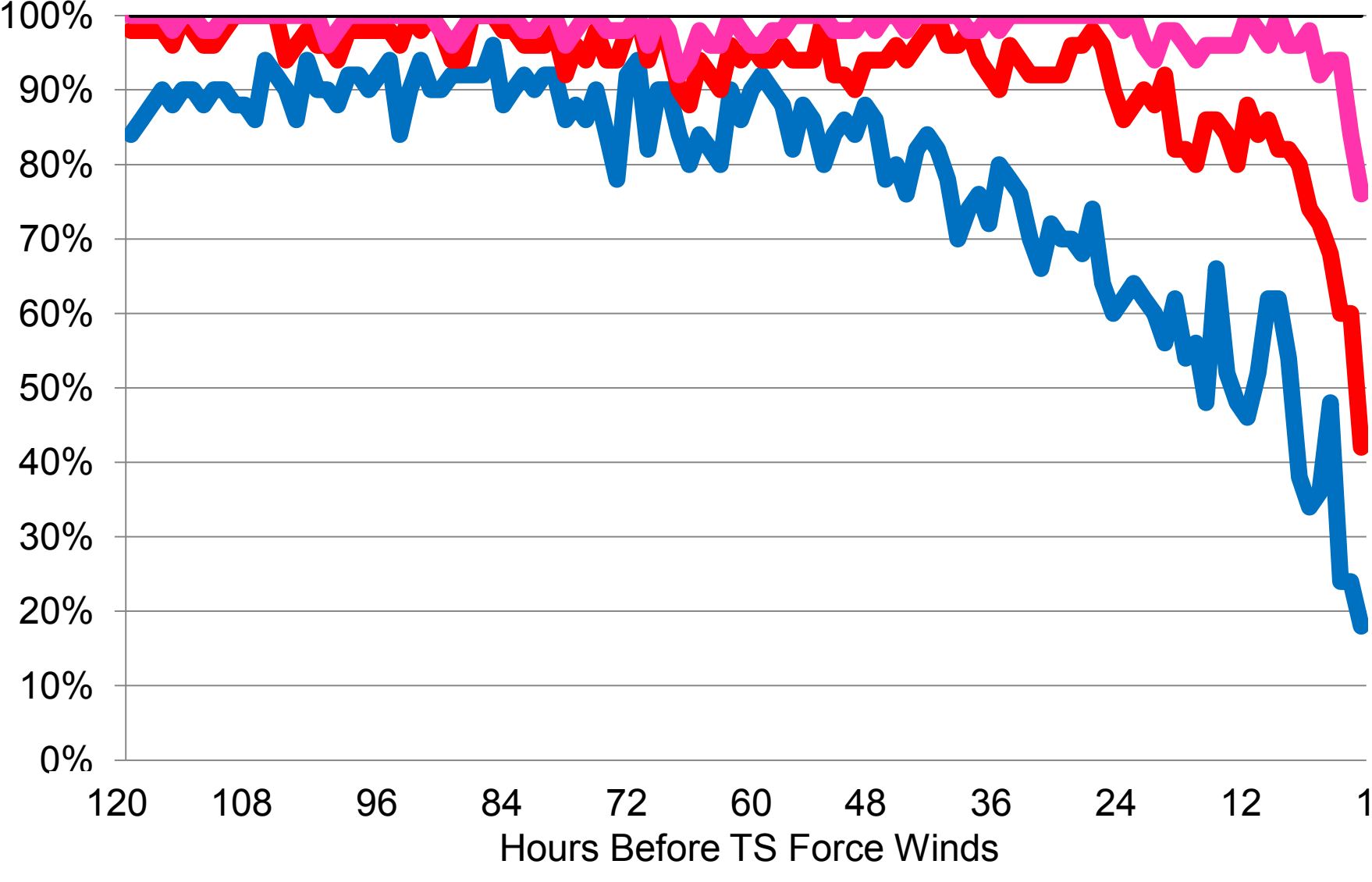
Graph 6. Major Hurricanes (9 Storms, 76 Stations)



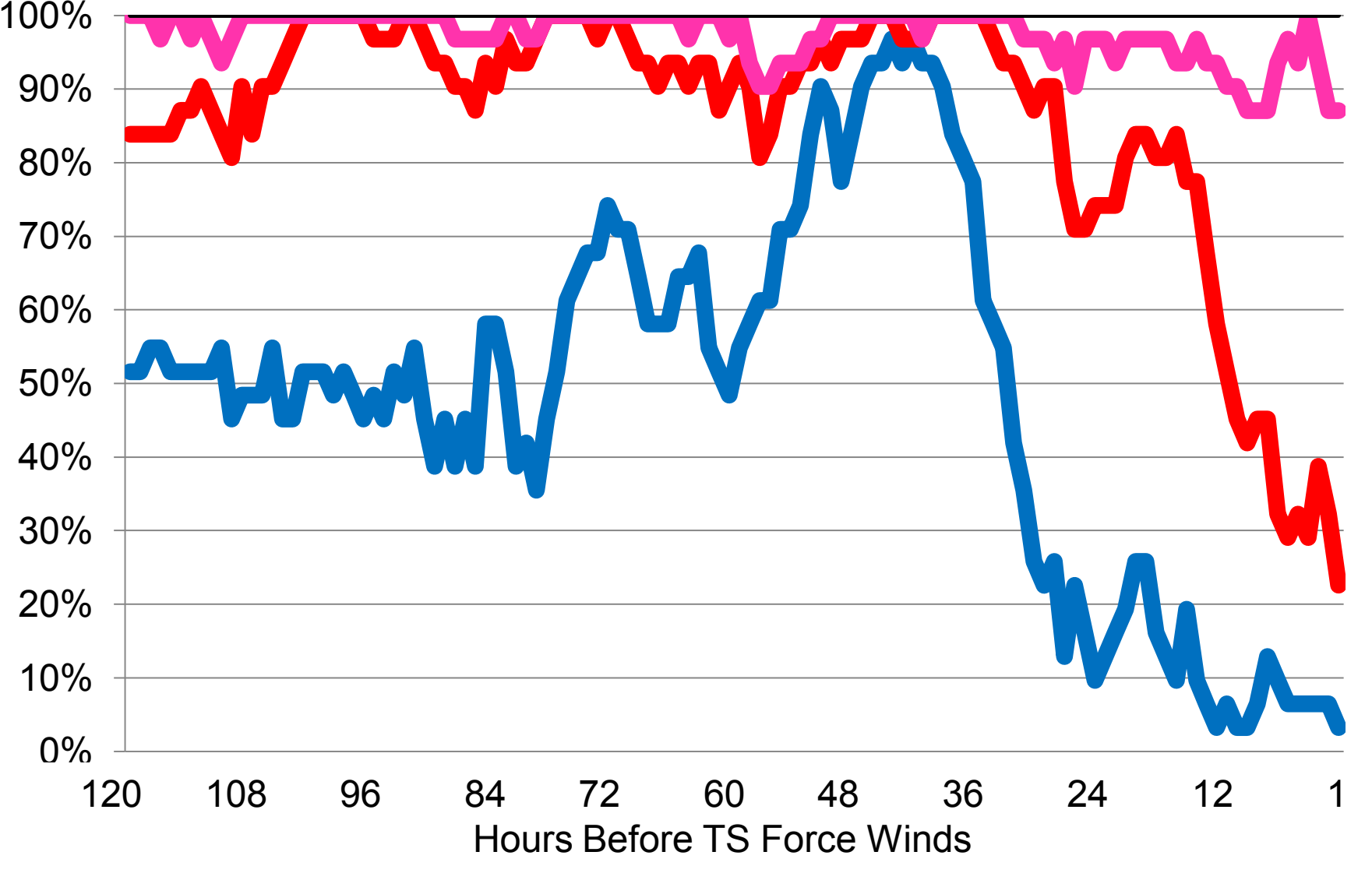
Graph 7. Cat. 1/2 Hurricanes (22 Storms, 190 Stations)



Graph 8. Tropical Storms (19 Storms, 50 Stations)



Graph 9. Hurricane Sandy (2012) (31 Stations)



Graph 10. Hurricane Irene (2011) (25 Stations)

